

## CLAIMS

[1] An image decoding device which decodes a coded picture on a block-by-block basis, said image decoding device comprising:

5 a decoding unit operable to sequentially decode each block included in the coded picture;

a storage unit in which each block decoded by said decoding unit is stored;

10 a filter unit operable to apply filtering processing to each block decoded by said decoding unit;

a first executing unit operable to store the decoded block into said storage unit every time the block is decoded by said decoding unit, and to apply the filter processing to the block stored in said storage unit by said filter unit;

15 a second executing unit operable to apply the filtering processing to the decoded block by said filter unit, every time the block is decoded by said decoding unit; and

20 a switch control unit operable to switch between an operation performed by said first executing unit and an operation performed by said second executing unit.

[2] The image decoding device according to Claim 1,

wherein said switch control unit is operable to

25 switch between the operation performed by said first executing unit and the operation performed by said second executing unit, depending on an order of the blocks to be sequentially decoded by said decoding unit.

[3] The image decoding device according to Claim 2,

30 wherein said switch control unit is operable to:

prohibit the operation performed by said first executing unit and permit the operation performed by said second executing unit,

when the order of the blocks to be sequentially decoded by said decoding unit is a regular order of decoding the blocks continuously from a block positioned at an edge of the picture; and

5       prohibit the operation performed by said second executing unit and permit the operation performed by said first executing unit, when the order of the blocks to be sequentially decoded by said decoding unit is not the regular order.

[4]     The image decoding device according to Claim 1,  
10       wherein said switch control unit is operable to switch between the operation performed by said first executing unit and the operation performed by said second executing unit, depending on the number of the blocks to be decoded by said decoding unit within a predetermined time period.

15       [5]     The image decoding device according to Claim 4, wherein said switch control unit is operable to:  
prohibit the operation performed by said first executing unit and permit the operation performed by said second executing unit,  
20       when the number of the blocks to be decoded by said decoding unit within the predetermined time period is larger than a predetermined value; and

prohibit the operation performed by said second executing unit and permit the operation performed by said first executing unit,  
25       when the number of the blocks is equal to or smaller than the predetermined value.

[6]     The image decoding device according to Claim 2,  
wherein said switch control unit is operable to  
30       switch between the operation performed by said first executing unit and the operation performed by said second executing unit, based on filter information which indicates a portion

that is in the block and is to be applied with the filtering processing, when the order of the blocks to be sequentially decoded by said decoding unit is not a regular order of decoding the blocks continuously from a block positioned at an edge of the picture.

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[7] The image decoding device according to Claim 1,  
wherein said switch control unit is operable to  
switch between the operation performed by said first  
executing unit and the operation performed by said second  
10 executing unit, depending on a type of a coded signal including the  
coded pictures.

[8] The image decoding device according to Claim 7,  
wherein said switch control unit is operable to:

15 prohibit the operation performed by said first executing unit  
and permit the operation performed by said second executing unit,  
when a determination is made, based on the type of the coded signal,  
that the blocks need to be decoded continuously from a block  
positioned at an edge of the picture; and

20 prohibit the operation performed by said second executing  
unit and permit the operation performed by said first executing unit,  
when the determination is not able to be performed.

[9] The image decoding device according to Claim 1,  
25 wherein said switch control unit is operable to:

obtain an external signal which indicates whether or not the  
blocks need to be decoded continuously from a block positioned at  
an edge of the picture;

30 prohibit the operation performed by said first executing unit  
and permit the operation performed by said second executing unit,  
when the external signal indicates that the blocks need to be  
decoded continuously; and

prohibit the operation performed by said second executing unit and permit the operation performed by said first executing unit, when the external signal indicates that the blocks should not be decoded continuously.

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[10] An image encoding device which codes a picture on a block-by-block basis, said image encoding device comprising:

a coding unit operable to sequentially code each block included in the picture;

10 a decoding unit operable to sequentially decode the coded block, every time the block is coded by said coding unit;  
a storage unit in which each block decoded by said decoding unit is stored;

15 a filter unit operable to apply filtering processing to each block decoded by said decoding unit;

a first executing unit operable to store the decoded block into said storage unit every time the block is decoded by said decoding unit, and to apply the filtering processing to the block stored in said storage unit, by said filter unit;

20 a second executing unit operable to apply the filtering processing to the decoded block by said filter unit, every time the block is decoded by said decoding unit; and

25 a switch control unit operable to switch between an operation performed by said first executing unit and an operation performed by said second executing unit.

[11] The image encoding device according to Claim 10,

wherein said switch control unit is operable to

30 switch between the operation performed by said first executing unit and the operation performed by said second executing unit, depending on an order of the blocks to be sequentially decoded by said decoding unit.

[12] The image encoding device according to Claim 11,  
wherein said switch control unit is operable to:

prohibit the operation performed by said first executing unit  
5 and permit the operation performed by said second executing unit,  
when the order of the blocks to be sequentially decoded by said  
decoding unit is a regular order of decoding the blocks continuously  
from a block positioned at an edge of the picture; and  
prohibit the operation performed by said second executing  
10 unit and permit the operation performed by said first executing unit,  
when the order of the blocks to be sequentially decoded by said  
decoding unit is not the regular order.

[13] The image encoding device according to Claim 10,

15 wherein said switch control unit is operable to  
switch between the operation performed by said first  
executing unit and the operation performed by said second  
executing unit, depending on the number of the blocks to be coded  
and decoded by said coding unit and said decoding unit within a  
20 predetermined time period.

[14] The image encoding device according to Claim 11,  
wherein said switch control unit is operable to

switch between the operation performed by said first  
25 executing unit and the operation performed by said second  
executing unit, based on filter information which indicates a portion  
that is in the block and is to be applied with the filtering processing,  
when the order of the blocks to be sequentially decoded by said  
decoding unit is not a regular order of decoding the blocks  
30 continuously from a block positioned at an edge of the picture.

[15] The image encoding device according to Claim 10,

wherein said switch control unit is operable to  
switch between the operation performed by said first  
executing unit and the operation performed by said second  
executing unit, depending on a method of coding performed by said  
5 coding unit.

[16] The image encoding device according to Claim 15,  
wherein said switch control unit is operable to:  
prohibit the operation performed by said first executing unit  
10 and permit the operation performed by said second executing unit,  
when a determination is made, depending on the method of coding,  
that the blocks need to be continuously decoded from a block  
positioned at an edge of the picture; and  
prohibit the operation performed by said second executing  
15 unit and permit the operation performed by said first executing unit,  
when the determination is not able to be performed.

[17] An image decoding method of decoding a coded picture on a  
block-by-block basis, said image decoding method comprising:  
20 a decoding step of sequentially decoding each block included  
in the coded picture;  
a first executing step of storing the decoded block into a  
storage medium, every time the block is decoded in said decoding  
step, and of applying filtering processing to the block stored in the  
25 storage medium;  
a second executing step of applying the filtering processing to  
the decoded block, every time the block is decoded in said decoding  
step; and  
a switch controlling step of switching between an operation  
30 performed in said first executing step and an operation performed in  
said second executing step.

[18] An image coding method of coding a picture on a block-by-block basis, said image coding method comprising:

a coding step of sequentially coding each block included in the picture;

5 a decoding step of sequentially decoding the coded block, every time the block is coded in said coding step;

a first executing step of storing the decoded block into a storage medium every time the block is decoded in said decoding step, and of applying filtering processing to the block stored in the  
10 storage medium; and

a second executing step of applying the filtering processing to the decoded block, every time the block is decoded in said decoding step; and

a switch controlling step of switching between an operation  
15 performed in said first executing step and an operation performed in said second executing step.

[19] An integrated circuit which decodes a coded picture on a block-by-block basis, said integrated circuit comprising:

20 a decoding unit operable to sequentially decode each block included in the coded picture;

a storage unit in which each block decoded by said decoding unit is stored;

25 a filter unit operable to apply filtering processing to each block decoded by said decoding unit;

a first executing unit operable to store the decoded block into said storage unit every time the block is decoded by said decoding unit, and to apply the filtering processing to the block stored in said storage unit, by said filter unit;

30 a second executing unit operable to apply the filtering processing to the decoded block by said filter unit, every time the block is decoded by said decoding unit; and

a switch control unit operable to switch between an operation performed by said first executing unit and an operation performed by said second executing unit.

5 [20] An integrated circuit which codes a picture on a block-by-block basis, said integrated circuit comprising:

a coding unit operable to sequentially code each block included in the picture;

10 a decoding unit operable to sequentially decode the coded block, every time the block is coded by said coding unit;

a storage unit operable in which each block decoded by said decoding unit is stored;

a filter unit operable to apply filtering processing to each block decoded by said decoding unit;

15 a first executing unit operable to store the decoded block into said storage unit, every time the block is decoded by said decoding unit, and to applying the filtering processing to the block stored in said storage unit, by said filter unit;

20 a second executing unit operable to apply the filtering processing to the decoded block by said filter unit, every time the block is decoded by said decoding unit; and

a switch control unit operable to switch between an operation performed by said first executing unit and an operation performed by said second executing unit.